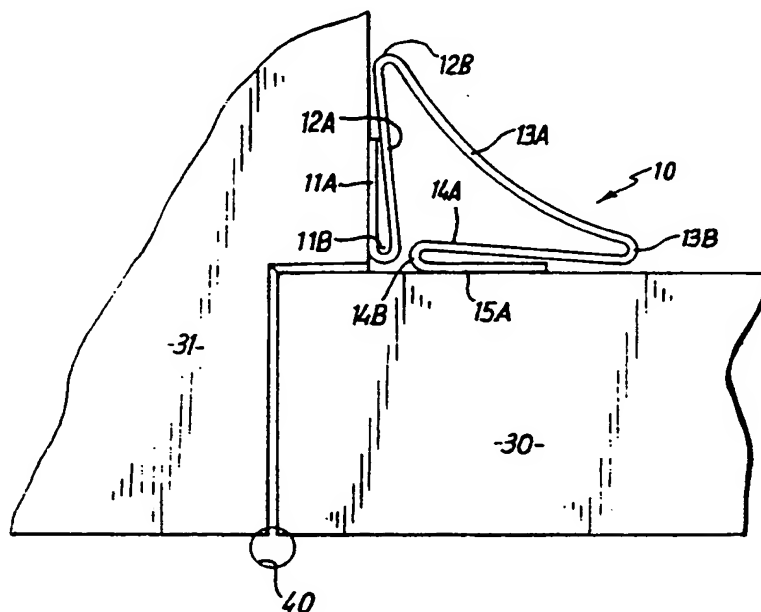




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(54) Title: DOOR FINGER GUARD



(57) Abstract

The invention describes an improved door finger guard (10) to prevent people from trapping their fingers between the edge of a door and the door frame. The invention is arranged to lie neatly between a door surface and a door frame (31) when the door (30) is closed so that it does not intrude in a passage way and in effect forms a hypotenuse of a triangle. The door finger guard (10) of the present invention comprises alternating regions of relatively rigid (11A, 12A, 13A, 14A, 15A) and relatively flexible (11B, 12B, 13B, 14B) plastics materials. The invention also describes a novel method of producing the aforesaid door finger guard.

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Door finger guard

This invention relates to door finger guards and more specifically it relates to an improved apparatus for use as a door finger guard and to a method of manufacturing the door finger guard.

Door finger guards are devices for preventing people from trapping their fingers between the edge of a door and the frame supporting the door. In the past the guard has usually been intended to prevent infants and children, who are not fully aware of the danger, from trapping their fingers. Because of the leverage involved considerable damage may be done to an infant's hand or fingers.

Examples of door finger guards are described in UK Patent Application 2 218 449 (Swaddle and Stones) in which a door finger guard is described as having hinges which are formed between longitudinal strips by virtue of there being relatively narrow portions of strips provided between relatively thicker portions of strips. The selective narrowing of the aforementioned portions to provide neck regions, is depicted in Figs. 3 to 5 of the aforementioned UK Patent Application.

A disadvantage with this type of door finger

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guard was that, because of the relatively narrow and thick longitudinal portions, the force exerted on the finger guard gave rise to an increased amount of stress at the junctions between the narrow and thick portions. This concentration of mechanical stress, if structural imperfections were present, could have lead to early failure of the plastics material around the neck region, with the result that the door finger guard may have had a relatively short life. Structural imperfections may arise during the fabrication stage.

Also because the three hinges along the door are collectively stiff, considerable resistance to the closing or opening of the door is presented. Depending on the "free" position of the hinge, it exerts an excessive force on the door finger guard fixing points. This may lead to the finger guard's fixing points coming loose.

A similar finger guard for a door is described in UK Patent Application 2 019 475 (Odie). This is a device for a door which comprises a strip of flexible material for attachment to the door and to the supporting framework. The strip is weakened on one side by a groove and reinforced on the other side by a flange.

However, a disadvantage with this type of finger guard has been that it presented a relatively

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sharp edge either when the door was open or when it was closed.

Furthermore the edge of the guard, depicted as reference numeral 10 in Figures 2 and 3 of UK Patent Application 2 019 475, presents a flap which may be tampered with by young children. Such tampering may damage the finger guard.

Many finger guard devices require the finger guard to function on doors which may be opened through an angle of as much as 170° . However, the finger guards in the two aforementioned UK Patent Applications are shown affixed to doors which open through 90° . If these finger guards are extended as shown in figure 8 to function with doors opening up to 170° the following effects would be very marked indeed:

Firstly the passage/access width through the doorway is considerably restricted when the door is open especially when the door is opened through 90° .

Secondly the door finger guard appears to be physically intrusive and untidy when the door is closed.

Thirdly the size of the door finger guard is large making it uneconomic to produce.

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A further disadvantage of the finger guards in the two aforementioned UK Patent Applications is that the triangular form presented to the access through the doorway when the door is open is rigid and unforgiving if it is knocked by an object being passed through the doorway. This finger guard is therefore especially vulnerable to being damaged by traffic through the doorway.

It is evident therefore that door finger guards are useful but as yet a door finger guard has not been provided which has the required robust characteristics in order for it to have a long life as well as being safe and neat in use and easy to install.

According to a first aspect of the present invention there is provided a plastics member having a substantially homogenous thickness comprising a first region and a second region, one of the region being relatively flexible compared with the other.

Means may be provided on a face of one or more of the regions which enable the, or each region, to adhere to a surface. These means may comprise adhesive tape having a surface which when revealed will adhere to a door frame or a door surface such as VELCRO material. Other means may include apertures through which screws or nails may be driven. Such apertures may have

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reinforced collars.

In a preferred embodiment the means provided on a surface comprises a double sided adhesive tape.

Preferably the door finger guard comprises a plurality of first regions and a plurality of second regions, the regions being arranged that a first region of plastics is always adjacent a second region and that the first region comprises a relatively rigid plastics material and the second region comprises a relatively flexible plastics material.

In a preferred embodiment one of the regions comprising relatively rigid plastics material is radiused.

The aforementioned door finger guard when correctly installed such that one of its regions is applied to a door frame and another is applied to a surface of a door, is so shaped that it folds neatly into a panel when the door is closed. This panel may be envisaged as being the hypotenuse of a triangle, the opposite and adjacent sides of which are formed by regions of the door finger guard attached to the door frame and door surfaces respectively. Furthermore because the finger guard adopts this "triangular" position, the aforementioned flap is not produced and the door finger guard may not be damaged, stretched or

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pulled away from the door face or door frame. The present invention thereby overcomes a problem with the door finger guards described in the two aforementioned documents.

According to a second aspect of the present invention there is provided a method for the production of a door finger guard wherein a first and a second grade of plastics material are directed through separate regions of an extrusion die to form a door finger guard having an homogenous thickness.

Preferably the two different grades of plastics material comprise a relatively rigid plastics material and a relatively flexible plastics material. These two plastics materials may be PVC composites.

The two different types of plastics material may include material of different colours, different strengths, different coefficients of expansion, or any other characteristic which is desired to be present in one material and not present in the other.

Preferably the thickness of the door finger guard is of the order of one millimetre and is advantageously less than one millimetre.

Of course more than two different grades of

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plastics materials may be used. By employing a plurality of grades of plastics materials it is possible to produce a strip having an homogenous thickness wherein the flexibility varies across the width of the strip such that at selected portions of the strip, the strip is relatively rigid whilst at other regions the strip is relatively flexible.

An embodiment of the invention will now be described by way of an example only and with reference to the figures in which:

Fig. 1 illustrates an end view of a door finger guard;

Fig. 2 illustrates diagrammatically, an arrangement for producing the door finger guard of figure 1;

Fig. 3 illustrates a section through the door finger guard of figure 1, mounted on a door frame and door, the door being in a closed position;

Fig. 4 illustrates a section through the door and door frame of Fig. 3 wherein the door is open to 170°;

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Fig. 5 illustrates a perspective view of the door finger guard, door and door frame of Fig. 4;

Fig. 6 illustrates a perspective view, similar to Fig. 5, but with the door open to 90° ;

Fig. 7 illustrates a section through a door and a door frame to which is attached an example of a PRIOR ART door finger guard, the door being in a closed position; and

Fig. 8 illustrates a section through a door and door frame to which is attached an example of a PRIOR ART door finger guard, the door being in an open position.

Referring to Fig. 1 a door finger guard is shown generally at 10. The door finger guard comprises rigid regions 11A, 12A, 13A, 14A, and 15A. It also comprises relatively flexible regions sandwiched between the aforementioned relatively rigid regions. These relatively flexible regions are formed from a different grade of PVC composite plastics material than the relatively rigid regions 11A, 12A, 13A, 14A and 15A. The relatively flexible regions act as miniature hinges and although only each region flexes through a relatively

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small angle the overall effect is to enable the door finger guard 10 to flex through a larger angle of approximately 170° . It is useful to envisage an analogy of a spine of vertebrae in which individual vertebra may only move through a small angle, relative to the adjacent vertebra, but the overall effect is that the spine may bend through a relatively large angle. The finger guard 10 has an homogeneous thickness to which is preferably 0.7 of a millimetre.

Referring to Fig. 2 a production line indicated generally at 20 comprises a first hopper 21 and a second hopper 22. In the first hopper 21 contains a plastics grade material A and the hopper 22 contains plastics material having a grade B. Connecting pipes 23A and 23B connect the two hoppers 21 and 22 respectively to a die 24. The connecting pipes 23A and 23B have a series of branch pipes which channel the different grade of plastics material to different regions of the die 24.

The plastics materials A and B are then fed into a die, under the necessary heat and pressure, such that the plastics materials are extruded out of the mould to form the door finger guard 10. Regions of relatively flexible material are indicated diagrammatically by cross hatching at B, whereas regions of relatively rigid material are indicated on the door

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finger guard 10 at A. The finger guard is drawn in the direction of arrow X along a production line (not shown) where the guard 10 may be supported by rollers until it cools. The finger guard 10 is then cut into strips of suitable length.

Fig. 3 shows a door 30 in a closed position and the finger guard 10 folded in the corner between door frame 31 and the door 30. End regions 11A and 15A of the finger guard 10, which are relatively rigid, are fixed to the door frame 31 and door 30 respectively. They are fixed by a double sided adhesive tape (not shown).

Fig. 4 shows the finger guard 10 fully extended and how the relatively flexible portions of the door finger guard flex so as to enable the door 30 to be opened. It is a relatively easy task to produce a finger guard 10 which may be used in situations requiring a greater or less opening angle of opening of 170° , by including more or less regions of relatively rigid and or relatively flexible plastics materials.

Referring to figures 5 to 8 inclusive, in which like parts bear the same reference numerals as in figures 1 to 4, it is evident that the finger guard 10, the subject of the present application, presents less of its surface, within the space defined by the door frame,

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than the finger guard 50 shown in figures 7 and 8. An advantage with the arrangement shown in figures 5 and 6, is that a passage-way (not shown) is not obstructed when the door 30 is opened. In particular, if reference is made to figure 8, the finger guard shown as PRIOR ART obtrudes into a passage-way or door-way when the door 30 is opened. Clearly this is undesirable from the point of view, that people or objects passing through the door-way may knock into the finger guard possibly either dislodging it or damaging it. Because the finger guard of the present invention folds back on itself, by virtue of the dual grades plastics nature of its composition and the radiussed section 13A, the finger guard 10 "hugs" the frame, the end of the door and the region therebetween and does not obstruct the door-way to the same extent as the finger guard of the PRIOR ART. The extent of obstruction is shown in figure 8 by the normal line W-W drawn from the point of contact of the finger guard at the door frame 31.

It will be appreciated that variation may be made to the invention without departing from the scope of the invention for example by varying the grades of plastics materials used in the hoppers or by producing the door finger guard in an alternative, but equivalent, manufacturing process. Similarly variation may be made to the grade of plastics during an extrusion stage.

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Similarly variation may be made to the invention by laminating strips of card within a plastics cover. The card would impart additional rigidity to one of the plastics regions. The invention may also be formed from polyethylene or a mixture of PVC and polyethylene.

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CLAIMS

1. A plastics member having a substantially homogeneous thickness, comprising a first region and second region, one of the regions being relatively flexible compared with the other.

2. A plastics member according to claim 1 for use as a door finger guard.

3. A plastics member according to claim 1 or claim 2 wherein a plurality of relatively rigid regions are provided, with relatively flexible regions being disposed between relatively rigid regions.

4. A member according to any preceding claim wherein means are provided on a region to adhere to a surface.

5. A member according to any of claim 4 wherein the means comprises a velcro material for affixing the region to a door frame or door surface.

6. A member according to claim 4 wherein the means comprises screws.

7. A member according to claim 4 wherein the means comprises a double sided adhesive tape.

8. A member according to any preceding claim wherein

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one of the regions comprising the relatively rigid plastics material is radiussed.

9. A member according to any of claims 3 to 8 wherein the member is arranged to fold into a triangular panel when the door to which it is attached is closed.

10. A member according to any preceding claim wherein five relatively rigid regions are separated by four relatively flexible regions.

11. A method of manufacture of a door finger guard wherein a first and a second grade of plastics material is directed through separate regions of an extrusion die to form a door finger guard having an homogeneous thickness.

12. A method according to claim 11 wherein the two different grades of plastics material comprise a relatively rigid plastics material and a relatively flexible plastics material.

13. A method according to claim 11 or 12 wherein the two plastics materials are PVC composites.

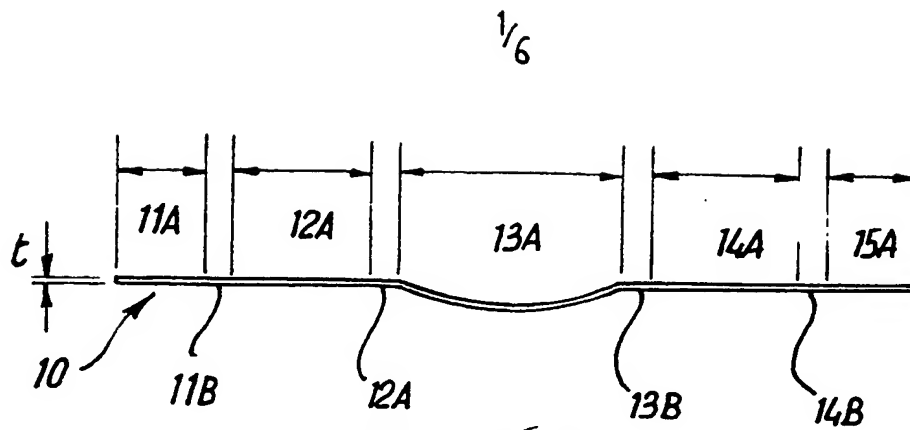
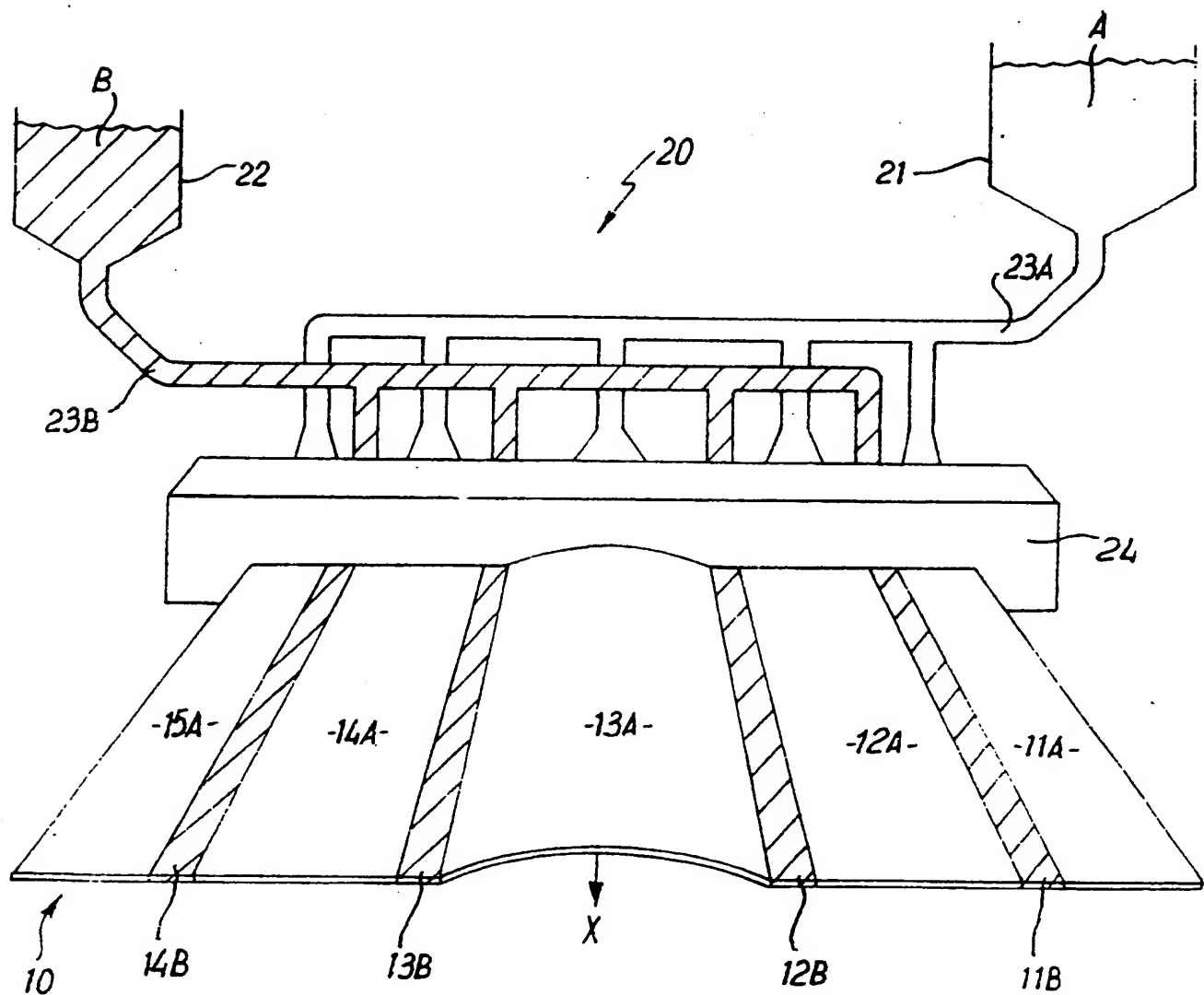
14. A method according to claim 11 or 12 wherein the two plastics materials are polyethylene composites.

15. A method according to any of claims 11 to 14

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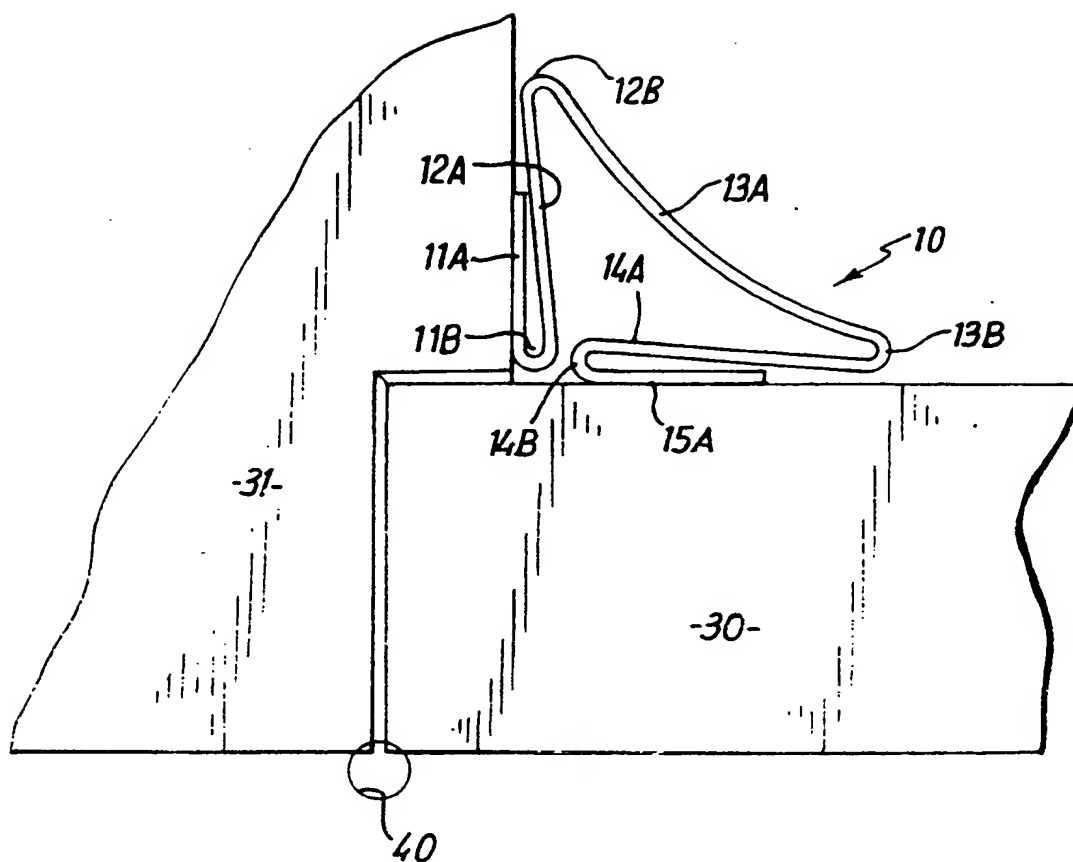
wherein the plastics materials are of different strengths.

16. A method according to any of claims 11 to 14
wherein the plastics materials have different coefficients
of expansion.

**FIG. 1****FIG. 2**

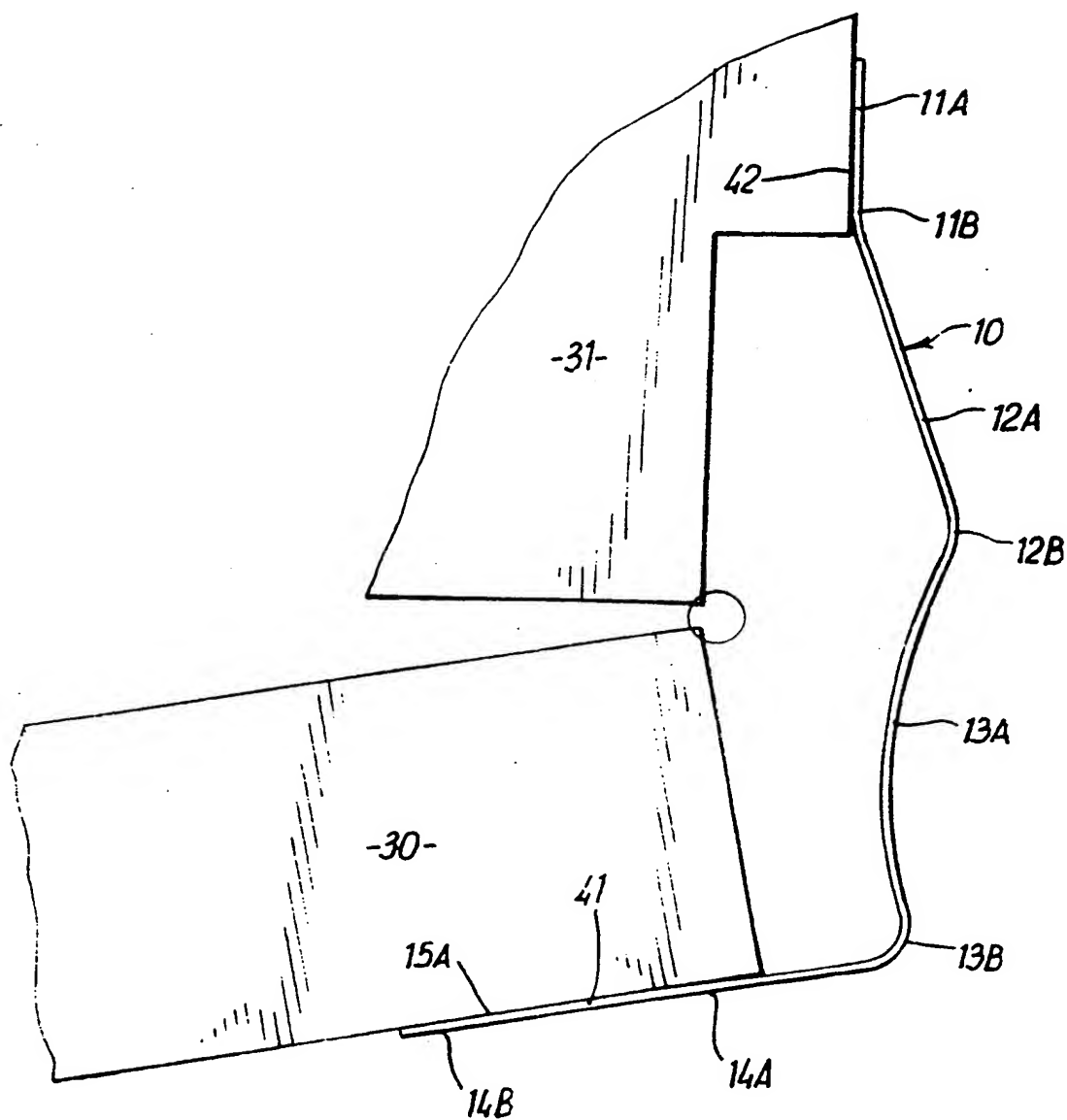
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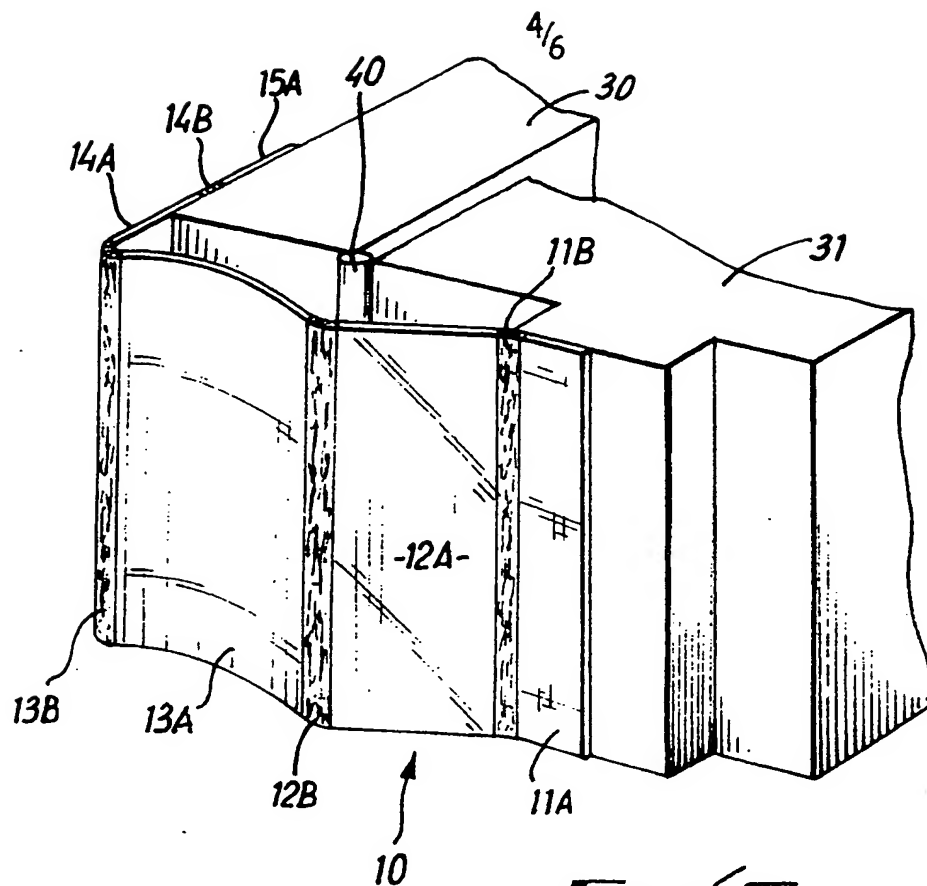
**FIG. 3**

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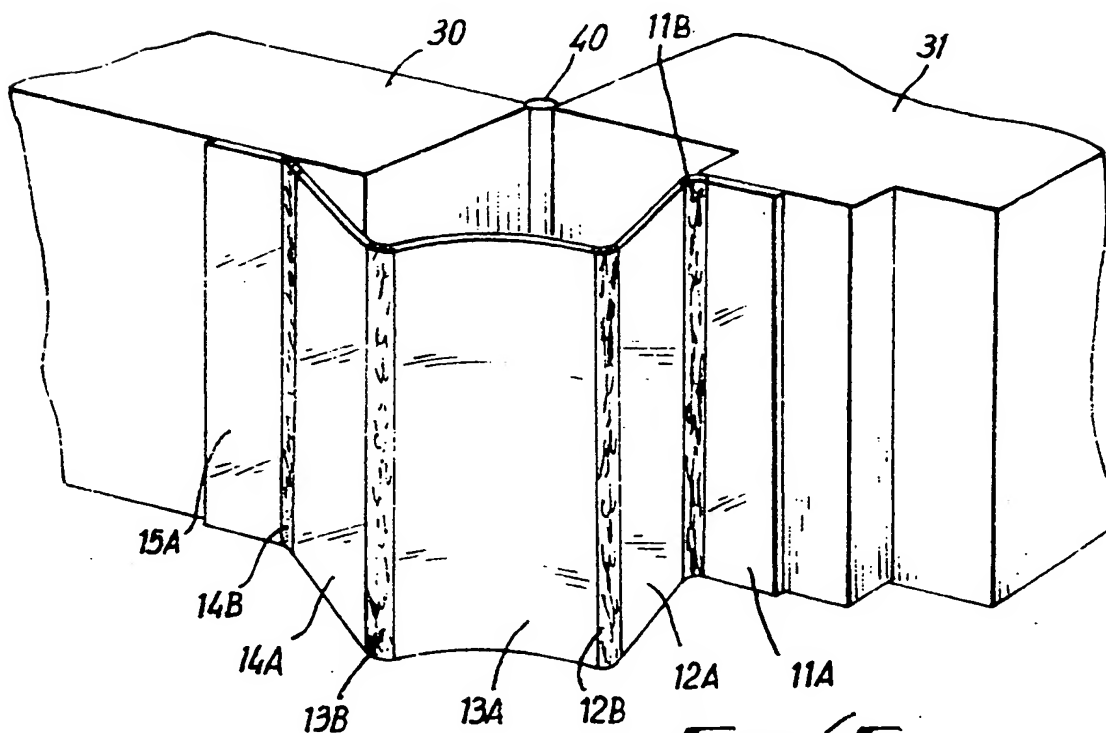
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**FIG. 4**

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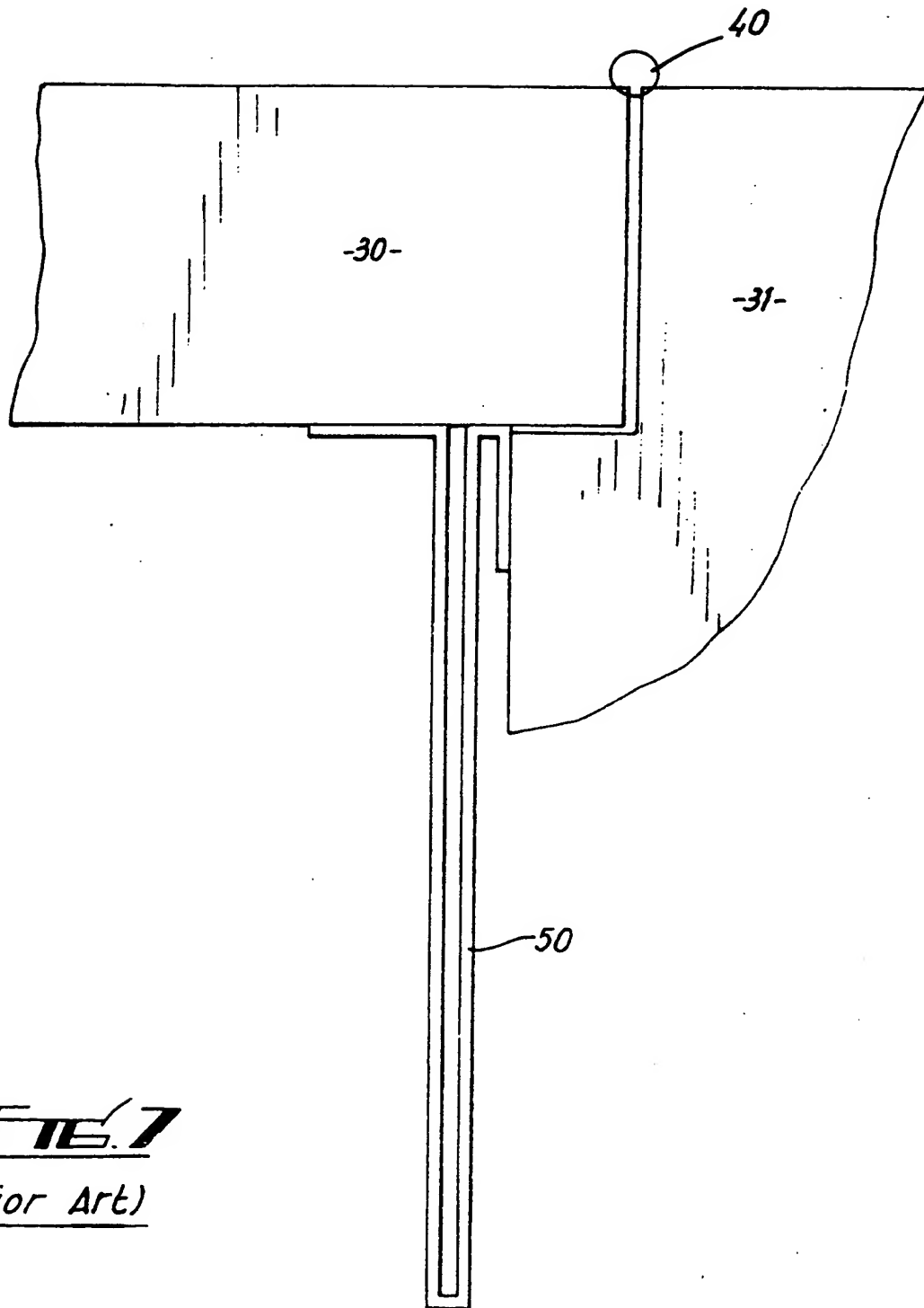
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FTE.6

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FTE.7
(Prior Art)

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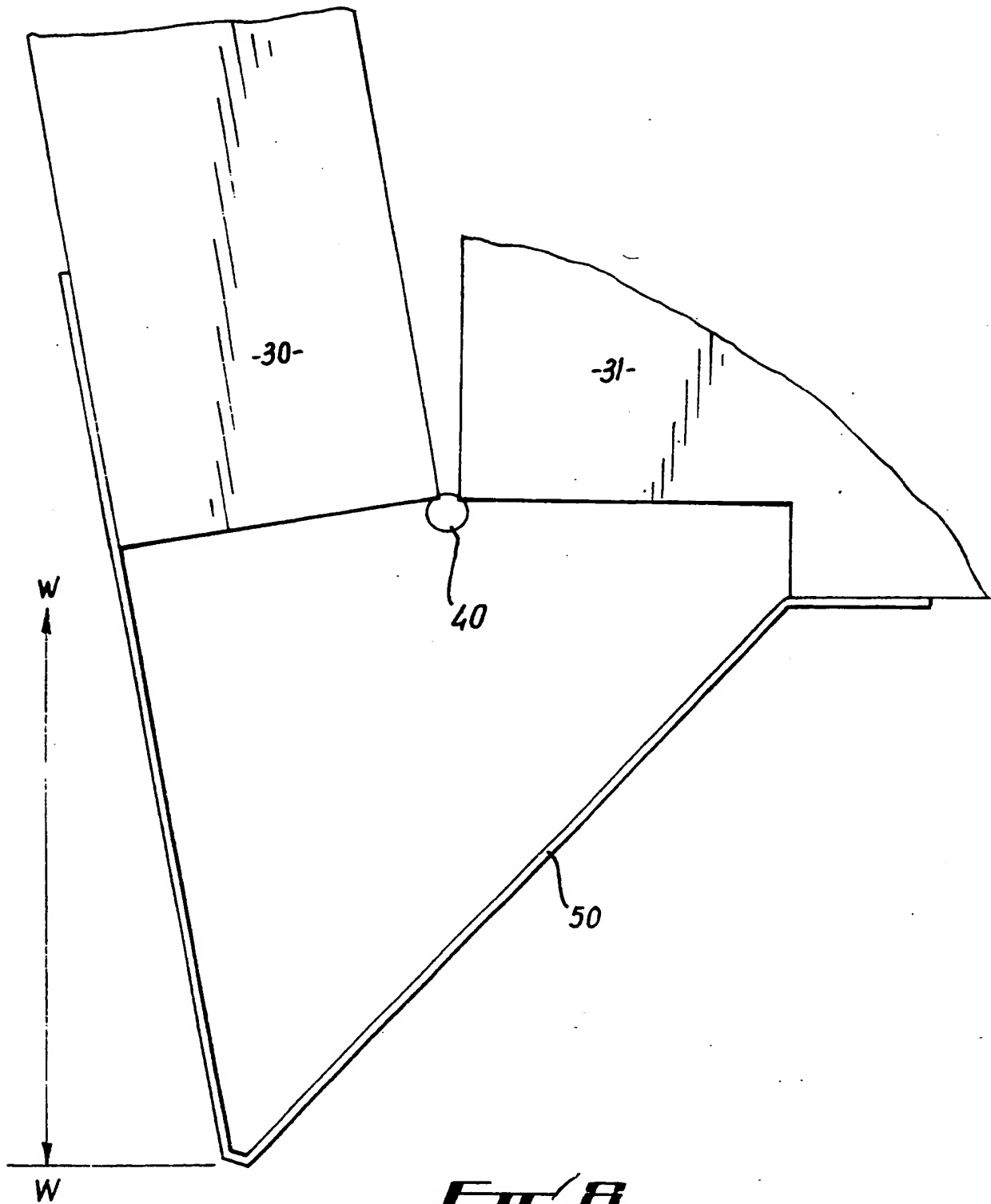


FIG. 8
(Prior Art)

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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	US,A,2 641 792 (PEELER) 16 June 1953 see column 3, line 58 - column 5, line 37; figures ---	2,4,6,8, 9
A	GB,A,2 218 449 (SWADDLE) 15 November 1989 cited in the application see page 3, line 19 - page 8, line 15; figures ---	1-4,6,7
A	GB,A,2 019 475 (ODIE) 31 October 1979 cited in the application see claims 1,5,6; figures ---	14

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. GB 9200405
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9012945	01-11-90	FR-A- 2646460	02-11-90
		FR-A- 2659686	20-09-91
		AU-A- 5657790	16-11-90
		EP-A- 0422197	17-04-91
		US-A- 5092077	03-03-92
NL-A-8501481	16-12-86	None	
NL-A-8303162	01-04-85	None	
US-A-2641792		None	
GB-A-2218449	15-11-89	None	
GB-A-2019475	31-10-79	None	

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